

Unit 5 - Trigonometry

L1(7.1) Congruent & Similar Triangles

Definitions:

1. **Ratio** - a relationship between two quantities, usually expressed as a fraction.
2. **Proportional** - all ratios between corresponding sides are equal between two objects, and the ratio is called the scale factor.
3. **Congruent** - two objects are congruent if they have the same dimensions and shape (the scale factor is 1)
4. **Similar** - objects are proportional, but not congruent (the scale factor is not 1)

Congruent - Triangles

Proven if : SSS (ratio are the same)

SAS - "angle contained" (2 side ratios and 1 angle the same)

ASA - "side contained" (2 angles and 1 side ratio the same)

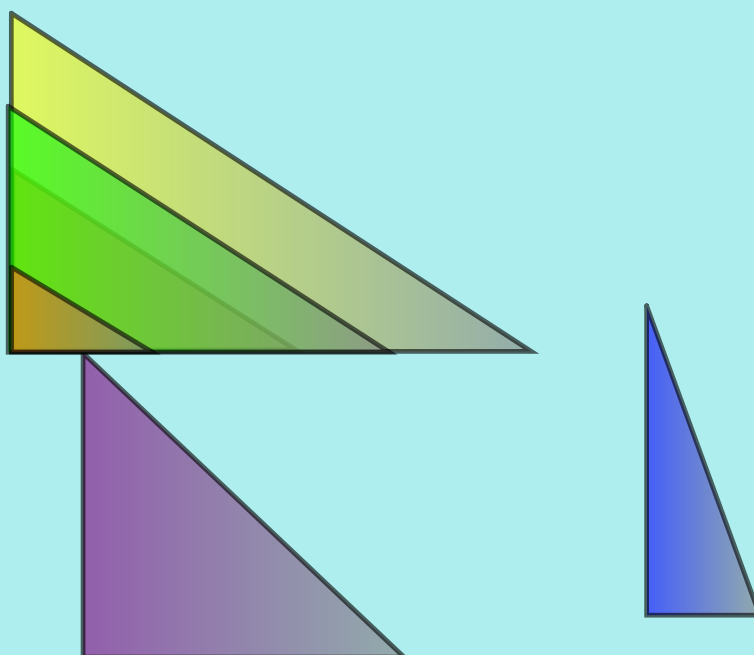
Similar - Triangles

Proven if: SSS~ (all side ratios are proportional)

SAS~ (2 side ratios are proportional and 1 angle the same)

AA~ (2 angles are the same)

Which shapes are congruent? proportional?



Parallel Line Theorems

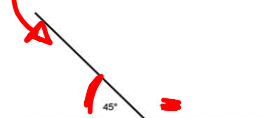
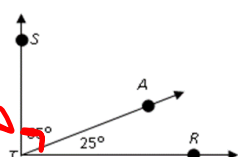
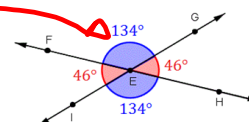
Z pattern	F pattern	C pattern
Alternate angles are equal	Corresponding angles are equal	Co-interior angles add to 180°

Remember....

SAt - Supplementary Angle Theorem

OAt - Opposite Angle Theorem

CAt - Complimentary Angle Theorem

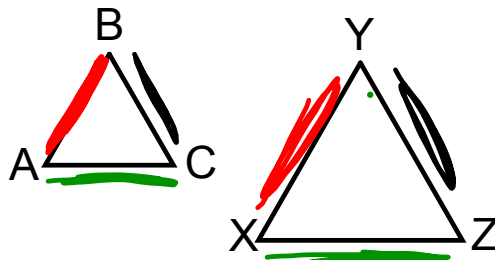


In similar triangles

- corresponding sides are proportional (i.e., the ratios are equal)
- corresponding angles are equal.

Given $\triangle ABC \sim \triangle XYZ$

⇒ * the order that we write the vertices is important

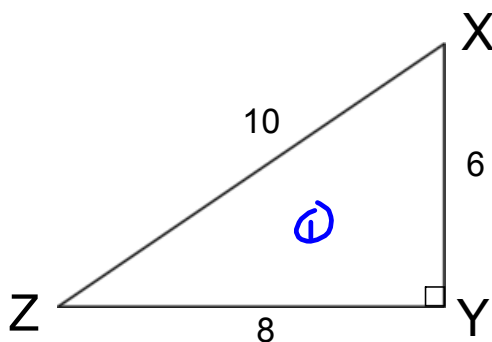
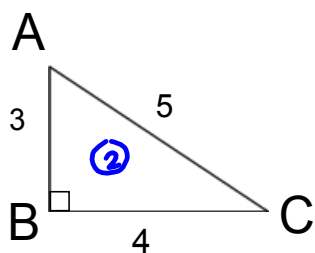


Sides: $\frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$

Angles: $\angle A = \angle X$
 $\angle B = \angle Y$
 $\angle C = \angle Z$

Ex.1 Are the triangles congruent? Similar? Neither?

(a)



Congruent: proven if SSS or SAS or ASA

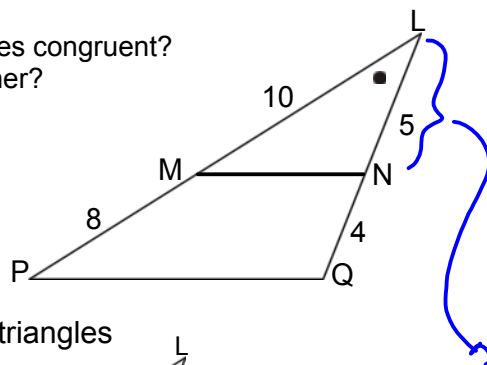
Similar: proven if SSS or SAS or AA~

∴ \triangle 's are similar by SSS

$$\frac{10}{5} = \frac{8}{4} = \frac{6}{3}$$

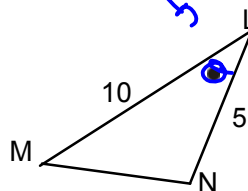
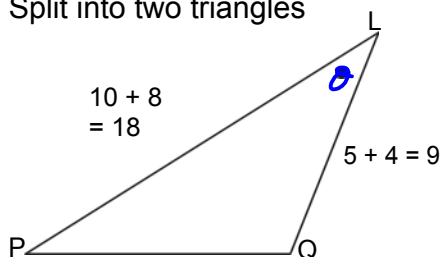
$$2 = 2 = 2$$

(b) Are the triangles congruent?
Similar? Neither?



Steps:

1) Split into two triangles



2) Prove similar or congruent

$\therefore \Delta$'s are similar
by SAS

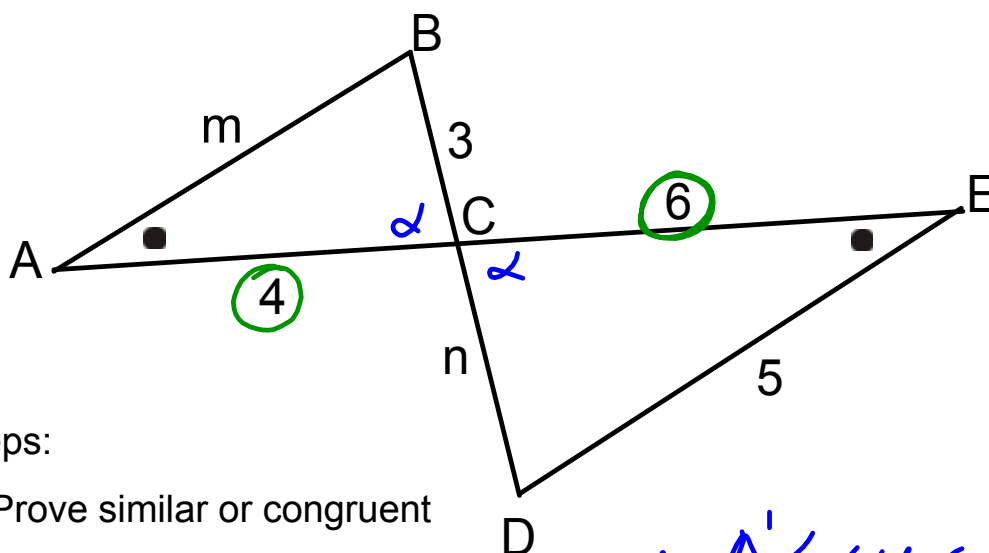
$$\frac{18}{10} = \frac{9}{5}$$

Reduce

$$\frac{9}{5} = \frac{9}{5}$$

$\angle PLQ = \angle MLN$ (given)

Ex.2 Determine the value of m & n.



Steps:

1) Prove similar or congruent

2) Solve for unknown

$\angle A = \angle E$ (given)
 $\angle ACB = \angle ECD$ (OAT)

$\therefore \Delta$'s are similar
by AA ~

Assigned Work:

Read p.374 - 378

Answer p.378 # 1, 2, 4ac, 5, 6, 7ab, 8cd, 13